

# THE DEVELOPMENT OF CEYLON'S FISHING INDUSTRY

BY

E. R. A. DE ZYLVA

*Acting Director of Fisheries, Ceylon*

## INTRODUCTION

Ceylon, with a population of 6.7 millions in 1946, had just over 100,000 persons engaged in the fishing industry, or 1.7% of the population. It is an interesting fact that the 1921 Census showed that out of a population of nearly 5 millions, just under 80,000 persons were engaged in the industry, also 1.7% of the population. Of those at present engaged in the industry, it is estimated that about 72,000 fishermen are actively engaged in sea fisheries, and just under 9,500 in inland fisheries.

The annual production of fish is estimated at 90 million lbs. In other words, the average fisherman lands about 1,500 lbs. of fish each year. Compared with the production of Denmark, where the average is 33,000 lbs. per head per year (5), this is very low. In 1952, Ceylon's fish imports were valued at 55 million rupees (17), representing about 90 million lbs. of cured and preserved fish. If it were possible for the local industry to double its present production, the country will have gone a long way towards achieving self-sufficiency in fish. How is this target to be achieved?

It is clear that the industry is operating at a low level of efficiency. Primitive craft, the absence of capital for investment by fishermen, social prejudices, and the lack of new ideas or the incentive to progress have worked together to keep the industry in the role of a Cinderella. Little progress in comparison with that achieved in agriculture has blessed the fishermen's lot. An earlier awakening of public consciousness of the deplorable conditions under which fishermen lived and worked (2) was largely overshadowed by the international situation resulting from World War II, and almost the only significant progress achieved during that decade was the revival of trawler fishing operations, which showed that, in spite of the high cost of production, a trawler could be expected to bring in about two million pounds of fish per year at a cost of about 50 cents a pound, and that local personnel could be found or trained to man the trawlers (3).

Much expert opinion has been and is being sought on the problems of developing the island's fishery potential, and this has yielded, and is yielding, much valuable data, from which future operations will benefit very considerably (4-9). The Government first secured the services of a Danish team consisting of a Senior biologist, a fisherman and a fish-food technologist for two months; since then, the Fisheries Division of the Food and Agriculture Organisation through the Indo-Pacific Fisheries Council and the Extended Technical Assistance

Programme, and more recently the Colombo Plan Technical Assistance Bureau, have provided personnel and equipment for the investigation of the Island's fishery problems. Their energies have been directed to the introduction of more effective capture operations, cultural operations, and secondary industrial development for the provision of storage, transport, processing and handling facilities, to ensure that fish reaches the consumer in the optimum condition (17).

#### PROBLEMS OF FISHERIES DEVELOPMENT

The development of the sea fisheries presents a complex problem. The present low level of production is partly the result of the use of primitive craft, with little inboard accommodation, and partly the result of vagaries in the availability of fishable stocks. As these craft are dependent on the wind, the fishermen are obliged to spend very little time in actual fishing operations, up to 4/5th of their time being spent on the daily voyage to and from the fishing grounds. The limited inboard accommodation permits the use of very restricted quantities of gear. The resultant income is very low, and the fishermen can barely earn sufficient to buy improved gear in more appropriate quantity, much less indeed buy mechanized craft. The Government has sought to rescue the industry from this plight by financing Co-operative Societies of fishermen, either as Producer Societies for the purchase of craft and gear, or as Credit and Sales Societies to enable them to secure for the primary producer as large as possible a proportion of the ultimate value paid by the consumer, by eliminating the many existing links in the chain between producer and consumer. About 5% of the fishermen have so far formed themselves into Co-operative Societies, notwithstanding the great deal of impetus which the Government has endeavoured to give the project. A possible inference from this experience is that the Co-operative Society is not ideally suited to meet the requirements of the fisherman (8). On the other hand, it may not be the Co-operative system, but rather the inflexible procedure which is attendant on a Government controlled organisation that is responsible for the small number of Fishing Co-operatives. A possible solution lies in the inauguration of a National Fishing Corporation, the legislation for the operation of which is now being finalised.

#### MECHANIZATION

The first impact of mechanization on the indigenous fishing industry in the Island came in 1949 when local fishing craft were towed out to well-known fishing grounds, which lay at some distance from the shore, and towed back to their base by an attendant mechanized craft (5). This enabled the fishermen to spend more time in actual fishing, and they made catches four or five times as large as was their wont. In certain districts, particularly in the northern half of the Island, there has been considerable interest shown in this type of operation. This is understandable, for the continental shelf is much wider in that region, whereas in the southern half of the island, the

shelf only averages from 6 to 12 miles in width. Fishermen have, however, shown some reluctance to meet the entire cost of the operation of the attendant 'mother ships', although they have had indisputably better incomes during towing operations, and there have been many difficulties in operating mother ships, the chief being the lack of suitable harbours or moorings in fishing centres for craft of this type.

While this phase was in operation, six small mechanized fishing boats three of 22 ft. and three of 20 ft. were purchased from Denmark on the advice of the F.A.O. Fishery Engineer. These were put on fishing operations with locally trained fishermen, and have shown that they are capable of bringing in considerably larger catches than local craft. These boats are powered by a simple semi-diesel, hot-bulb engine, and fitted with an auxiliary sail, and can be beached where the surf is not heavy. The capabilities of these boats are being demonstrated now to Co-operative Fishing Societies, and it is anticipated that a request to finance the purchase of similar craft will be forthcoming from these Societies (19).

A further development has been the inboard mechanization of one type of local craft, which is the only fishing vessel type that is capable of accommodating an engine. The F.A.O. Fishery Engineer has installed three small marine diesel engines, which were supplied by the F.A.O., in these craft, and the Co-operative Societies which are using these boats have found that they are able to get to the fishing grounds earlier, spend more time in capture operations, and get back in time to catch the market at its peak. Earning capacity has been trebled. Great interest has been aroused in this venture. Already fifteen other boats have been equipped by the fishermen with marine engines, and a further twenty engines are on order. It is proposed that suitable engines should be imported, and that hulls should be built locally (in an endeavour to rejuvenate the local boat-building industry which has seen better days), in order that more mechanized boats may be available to meet the demand. The above remarks apply to the northern regions of the Island, where the local fishing craft are suitable for inboard mechanization. The sleek, swift, outrigger canoe of the southern seaboard is regarded as having reached the limit of its development, and, in its class, it has no equal for seaworthiness, speed, and ability to land on surf-lashed beaches. Experiments with the use of an outboard motor on these craft have given flattering indications, but the outboard motor is still regarded as a fickle and delicate piece of machinery, which perhaps will not give maximum efficiency with the heavy surf in which these craft are launched and beached.

#### THE COLOMBO PLAN

The most recent development has been the Canadian sponsored Colombo Plan project, under which two multi-purpose Canadian West-Coast type fishing vessels, built in Vancouver, are operating, each under the command of 2 Canadian fishermen, assisted by local crews. One of the boats specializes in the capture of surface types

of fish, by trolling, ring-netting, gill-netting, and purse-seining while the other specializes in trawling, long-lining and demersal operations. These vessels have completed three months of exploratory fishing and will now engage in training local fishermen in the use of mechanized capture techniques. The trainees are to be drawn from Co-operative Fishing Societies, and will be financed to purchase suitable small boats and appropriate gear with which they will continue to fish on the lines of the training they have received. The hulls for these 20-30 ft. craft will be made locally; the engines will be imported for installation here. It is hoped that some of these trainees will be sent for further training in Canada under the Colombo Plan.

A part of the Canadian Aid has taken the form of a deep sea trawler, the 'Maple Leaf' equipped with a refrigerated fish-hold, which, with the Government trawler 'Braconglen' purchased in 1950 to replace the old trawler 'Raglan Castle', now makes a valuable contribution towards the island's fish supply. These trawlers fish on the Wadge Bank, some 4,500 sq. miles of trawling ground lying 150 miles to the west of Colombo (1), (3). Their catches vary from 70,000 to 140,000 lbs. for a 10- to 12-day trip, and, as they harvest a resource which is not normally drawn upon by indigenous fishermen, and on which no other regular fishery of any magnitude is based, their operations are being followed with a great deal of interest. Catches are now being studied in an effort to determine the productivity of the grounds and to detect any indications of depletionary tendencies in the fishery. A great extent of trawlable ground lies within commercially exploitable range of the Island, and this first successful tropical trawler fishery, which has now gone on for over 8 years without any sign of depletion, must undoubtedly be of great significance at the present time, when countries are turning their eyes towards the sea in their search for new sources of food for the people.

#### SHORE FACILITIES

The shore facilities which exist today will not be adequate either to service an increased number of mechanized craft, or to deal effectively with the distribution of the increased landings. As a first step towards the provision of improved facilities for fish handling, the Government is constructing four ice-making plants, three five-ton and one ten-ton, in important producer areas, each equipped with refrigerated ice-storage and fish-storage accommodation. The Canadian Aid under the Colombo Plan is providing a 500-ton cold storage plant for holding fish, with 40 tons per day ice production and 15 tons per day blast freezing equipment, and this is being planned in association with a pier for trawler unloading and provisioning, and accommodation for gear storage, repair workshops and offices. This unit will probably form the nucleus of the National Fishing Corporation, when that body is established. At present, all trawler landings are handled by the Co-operative Fish Sales Union, which provides sales facilities on a direct-from-producer-to-consumer basis under the supervision of technical personnel provided by the Government Co-operative and Fisheries Departments.



## BRACKISH-WATER FISHERIES

The backbone of the island's fishing operations, is, however, the beach seine, a large net which is set out in an arc from the beach, often extending  $1\frac{1}{2}$  miles out to sea, and drawn up to the shore by manual labour. The opinion has been expressed that this fishery has reached a depletionary phase (8). The owner now continues in the hope of realising one or two bumper harvests during a six-month season, to recoup his expenses. Part of the development programme must be devoted to a more economical and productive utilisation of this man-power. With the introduction of mechanised operations, it is likely that this activity will require less personnel than it now employs. In order to absorb this surplus man-power into productive fishery employment, it is proposed to divert it to cultural operations in the many thousands of acres of brackish water lagoons and marshes which skirt nearly every mile of the country's 800-mile coastline. This technique, which is now an established peasant routine in the Philippines, Indonesia and Malaya, is ideally suited to this Island's requirements (15). The particular species of fish on which the cultural operations are based are available in abundant supply in local waters. They are well-known in the markets, and command a ready sale. The introduction of this technique presents no difficulty other than that which is attendant upon any attempt on the part of a Government to change the established routine of a conservative community, which, on account of its poverty, is steeped in traditional suspicion of any departure from pristine practices. The potential for development is enormous. The market is assured.

## FRESH-WATER FISHERIES

The inland fisheries have received little attention save in the very recent past. There are an estimated 140,000 acres of fresh waters, rich in micro-organic life, which however are, in their natural state, almost entirely devoid of any plankton-feeding fish of food value. Some of these waters are perennial, while many dry up more or less regularly during the annual drought. Thus nature performs one of the tasks which the fish-farmer must carry out, if he would have a good yield in return for his labours. The wide distribution which the Giant Gourami, *Osphronemus gourami*, (a vegetation feeder which was accidentally introduced into a large river system about 40 years ago), has achieved, bears ample testimony to the potential which exists for fishes of this type in local waters.

These reservoirs, or 'tanks' as they are called, are scattered throughout the island, some in the well-populated and the majority in the sparsely-populated regions. It is in these sparsely-peopled areas that fish-farming can yield its most significant results, for here the diet of the peasant is notably deficient in protein, and fish farming will ensure the production of protein food in the areas where it is most needed. Marked success has been achieved through the introduction of the Cichlid mouth-breeder, *Tilapia mossambica*; it thrives in fresh and brackish environments, breeds rapidly and yields a fish of reasonable size and good flavour within a single season.

This fish has been widely distributed in rivers, swamps, and tanks throughout the island, and has already found its way into the markets where it is readily bought, reputedly on account of its resemblance to a sea-fish. (The peasantry show a marked preference for sea-fish!) The conditions for growth of *Tilapia*, and indeed of any other food fish, can be improved perceptibly by the removal of mud and silt from the bottom of the pond. This mud contains much organic matter which is of manurial value for crops, and it can be used with advantage as a dressing for arable land. The desilting of these tanks will not only improve their yield of fish but will also increase their water-holding capacity, enabling them to store during the rainy months many more acre feet of water for irrigation purposes than they do today. The effect of increasing progressively the water-holding capacity of the 'tanks' of the dry zone can have far-reaching effects on the development of those areas which are now largely under forest or support a small peasantry at a subsistence level.

Demonstration fish-rearing ponds are being constructed in collaboration with the Agricultural Department in its Experimental Stations and with the assistance of Rural Development Societies and private individuals, to popularize the farming of fish (18). There is so much in common between fresh-water fishery development work and Agriculture that a closer association of the two activities will undoubtedly be of benefit to both. For instance, the advantages of the introduction of fresh-water fish into paddy fields have not yet been appreciated in this country; there is an estimated 7% increase in the yield of rice (16), and the farmer gets a crop of fish as well. The dwarf gourami, *Trichogaster pectoralis*, which has been found most successful for this work in Thailand, has now been successfully introduced and established in Ceylon waters.

The average annual yield from an acre of fresh water may be conservatively put at 500 lbs. although, with careful farming, yields of 7,000 lbs. have been secured in Indonesia. At 500 lbs. per acre, this Island's fresh waters can yield 70 million lbs. of fish a year, almost sufficient to meet the present shortfall. The fresh-water fishery programme aims at establishing stocks in all rivers, tanks and perennial waters, to increase the available supply of food fish, and at maintaining stock ponds for supplying fingerlings to farming areas.

#### CONCLUSION

The chief obstacle to progress in the industry, apart from finance, is lack of 'know-how'. This is, to some extent, due to the present educational system, which, though it pays court to Agricultural education, does not give any thought to fishery education. A Fisheries Department alone cannot promote the development of the fishing industry. This requires the co-operation of several branches of Government. The inclusion of a course for the study of Fisheries in the Ceylon University will have far-reaching effects on the industry. Much fundamental research, which is essential as a background to an understanding of the lines along which development might take place, will be undertaken in the University. Secondary schools will

include the study of fisheries in their curricula in order to prepare students for the University. Literature from more progressive areas of the world, describing the development of fishery science and techniques, will be studied. Finally, technical schools will take up the practical training of those not suited to academic education, and will provide skilled technicians for employment in the many phases of the fishing industry, capture, processing and marketing on the one hand, and boat, net and gear manufacture and maintenance on the other. A new generation will rise up to develop an industry which, in view of the world shortage of food from the land, will bear an ever-increasing responsibility for the production of food for the people from the waters.

#### REFERENCES

1. Pearson, J., & Malpas, A. H. (1926): A Preliminary Report on the Possibilities of Commercial Trawling in the Sea around Ceylon. *Cey. Journ. Sci.*, C. II, 1926.
2. Report of a Sub-Committee of the Executive Committee of Local Administration on the Fishing Industry (1941): *Cey. Sessional Paper XI*. 1941.
3. Amirthalingam, C., & de Zylva, E. R. A. (1947): 'Commercial Trawling in Ceylon Seas', (Mimeo).
4. Hickling, C. F. (1947): Report on the Fisheries of Ceylon. *Cey. Sessional Paper VI*—1951.
5. Blegvad, H. (1949): Report to the Minister of Industries, Industrial Research and Fisheries, *Ibid*.
6. Petersen, E. (1949): Report on the Handling, Treatment, Packing, Transport, Refrigeration, Storage and Sale of Fish, with notes on Fishery By-products. *Ibid*.
7. John, C. C. (1949): Some suggestions for developing the Fisheries of Ceylon. *Ibid*.
8. Kesteven, G. L. (1949): Report on the Ceylon Fishing Industry. *Ibid*.
9. Schuster, W. H. (1951): Report on a survey of the Inland Fisheries of Ceylon. *Cey. Sessional Paper XXIV*—1951.
10. de Zylva, E. R. A. (1951): Administration Report of the Acting Director of Fisheries, (1940-47).
11. — — — (1952): Administration Report of the Acting Director of Fisheries, (1948-50). *Ibid*.
12. — — — (1952): Administration Report of the Acting Director of Fisheries, (1951). *Ibid*.
13. Croker, R. S. (1952): Fisheries Administration, Mimeo.
14. The Economic Development of Ceylon (1952): Report of a Mission organized by the International Bank for Reconstruction and Development.
15. Schuster, W. H. (1952): Fish Culture in Brackish Water Ponds of Java. *I.P.F.C. Spec. Publ.* No. 1.
16. Hofstede, A. E., & Ardiwinata, R. O. (1952): Compiling Statistical Data on Fish culture in irrigated rice fields in West Java.
17. de Zylva, E. R. A. (1953): Administration Report of the Acting Director of Fisheries, (1952).
18. — — — (1953): Fresh Water Fish Farming in Malaya as a guide to fish farming in Ceylon. *Fish. Dept. Bull.* No. 4.
19. — — — (1953): Catching More Fish. *Free World*, February 1953.